

**CURRICULUM**

**GUIDE**

Science – Grade 6

Providence  
Schools

## UNIT A

### Content students have to learn

### Processes students will learn and use

#### Unit A.1 – Atmospheric Conditions

(7 days)

- Observe and measure atmospheric conditions that affect local weather.
- Predict changes in weather conditions, such as wind and temperature, by examining and measuring atmospheric conditions.

- » Observe, measure, and record weather factors.
- » Describe weather instruments and the weather factors they measure.
- » Use weather instruments to measure atmospheric conditions.
- » Demonstrate safe practices during classroom investigations.
- » Use advance organizers to describe weather tools, the weather data they are used to collect, and their units of measurement.
- » Use nonlinguistic representations to organize weather data.
- » Use multimedia resources to study weather events.

#### Unit A.2 – Air Mass

(8 days)

- Identify the atmosphere as the layer of gases surrounding the earth.
- Understand that the earth's atmosphere is made up of layers and that each layer has its own unique characteristics.
- Know that weather occurs in the troposphere, the layer of the atmosphere closest to Earth.
- Understand that air is matter; it occupies space, has mass, and can be compressed.

- » Design and conduct investigations around the idea that air has mass and can be compressed.
- » Observe photos to study the atmosphere from space.
- » Demonstrate safe practices during classroom investigations.
- » Use graphic organizers to classify gases found in the atmosphere.

#### Unit A.3 – Seasons

(7 days)

- Describe how the tilt of the earth results in the sun's energy striking the earth at different angles.
- Understand that the intensity of light experienced on the earth depends on the angle at which sunlight strikes the earth.
- Explain how the tilt of the earth's rotation on its axis and revolution around the sun result in seasons.

- » Graph monthly day-length data for a single location to look for a pattern.
- » Use a globe and light bulb to model daily and seasonal variations in day length.
- » Use light sources and surfaces to model beam spreading.
- » Interpret a model of the position of the earth in relation to the sun.
- » Diagram the earth's revolution around the sun.

#### Unit A.4 – Energy Transformation

(6 days)

- Compare the differential heating of a variety of earth materials.
- Demonstrate that heat energy can be transferred through conduction and radiation.

- » Design and conduct investigations that introduce heat transfer by conduction and radiation.
- » Demonstrate safe practices during classroom investigations.
- » Use metaphors to apply understanding of radiation, conduction, and convection.

## UNIT A

### Content students have to learn

### Processes students will learn and use

#### Unit A.5 – Convection (5 days)

- Explain density as a ratio between a mass and its volume.
- Describe how materials of different densities interact.
- Explain how energy transfer drives the process of convection.

- » Design and conduct investigations that introduce heat transfer by convection.
- » Use a formula to calculate the density of a substance.
- » Collect data and draw conclusions about the densities of different liquids.
- » Demonstrate safe practices during classroom investigations.
- » Create illustrations to show the movement of heat.

#### Unit A.6 – Changes in the Atmosphere (10 days)

- Identify the relationship between temperature change and evaporation and condensation.
- Explain how dew and clouds form when humid air cools to its dew point and condenses.

- » Design and conduct investigations that introduce the physical changes of condensation.
- » Observe changes in temperature and measure dew point and relative humidity.
- » Demonstrate safe practices during classroom investigations.

#### Unit A.7 – Water Cycle (5 days)

- Identify various paths a water molecule might follow in the earth's water cycle.
- Explain condensation, precipitation, and other processes that cause variations in the water cycle.

- » Engage in classroom simulations.
- » Use multimedia to identify the various paths a water molecule might follow in the earth's water cycle.
- » Demonstrate safe practices during classroom investigations.
- » Create a process organizer for the water cycle.
- » Use a flow chart to compare and contrast changes in water during the water cycle.

#### Unit A.8 – Effects of Air Pressure (8 days)

- Describe the relationship between changing air pressure and wind.
- Explain how differential heating of the earth by the sun creates local winds.
- Investigate the effect of air pressure on weather.

- » Complete a diagram showing how local wind is produced.
- » Construct and use tools for measuring weather factors.
- » Interpret weather maps and predict the direction that winds will blow.
- » Demonstrate safe practices during classroom investigations.

## UNIT A

### Content students have to learn

### Processes students will learn and use

#### Unit A.9 – Climate (8 days)

- Explain the interactions between two air masses.
- Distinguish between weather and climate.
- Explain how a global temperature increase could affect the water cycle and the earth's climate.

- » Model an air mass.
- » Read and design weather maps.
- » Demonstrate safe practices during classroom investigations.

#### Unit A.10 – Energy (9 days)

- Describe energy transformations.
- Explain how the total energy of a falling object changes when that object hits the ground.
- List three ways that heat is transferred using real-world examples.
- Describe how sound energy moves through various materials.

- » Collect and record data during investigations.
- » Communicate valid conclusions supported by data.
- » Demonstrate safe practices during classroom investigations.
- » Use scientific thinking processes to conduct investigations and build explanations: observing, citing evidence, communicating, comparing, and analyzing.

#### Unit A.11 – Earth Processes (9 days)

- Understand that the interior of the earth is made of the inner core, outer core, mantle, and crust.
- Know that plates can move apart, collide, subduct, or slide past each other.
- Understand that plates probably move by convection and are affected by factors such as ridge push and slab pull.
- Identify and describe four types of mountains: fault block, folded, upwarped, and volcanic.
- Know that volcanic mountains can form on the surface of continents or under mid-ocean ridges.

- » Collect and record data during investigations.
- » Communicate valid conclusions supported by data.
- » Demonstrate safe practices during classroom investigations.
- » Use scientific thinking processes to conduct investigations and build explanations: observing, citing evidence, communicating, comparing, and analyzing.

## UNIT B

### Content students have to learn

### Processes students will learn and use

#### Unit B.1 – Earth’s Surface (4 days)

- Explain that a person’s specific location can be described in many ways, depending on the particular frame of reference.
- Explain that the number of Earth structures that can be identified decreases with elevation due to the ability of the eye (and other optical instruments) to resolve detail.

- » Draw a map.
- » Establish location in terms of frame of a reference.
- » Interpret representations in photographs.

#### Unit B.2 – Characteristics of Earth (3 days)

- Make connections between how objects disappear over the horizon and the shape of the earth.
- Gather evidence that the earth is round.
- Use latitude, longitude, and shadow length as evidence for a round Earth.

- » Use models and simulations to observe ships sailing on round and “flat” Earths.
- » Model sunlight shining on the poles.
- » Observe, collect, and graph data.
- » Demonstrate safe practices during investigations.

#### Unit B.3 – Earth’s Movement (6 days)

- Explain the day/night cycle as a consequence of an illuminated sphere rotating on an axis.
- Explain how to determine the direction of Earth’s rotation.
- Explain, using time zones, why it is a different time in other parts of the world.

- » Model the mechanics of day and night.
- » Use maps and globes.
- » Use astronomical data.
- » Demonstrate safe practices during investigations.

#### Unit B.4 – Characteristics of the Moon (5 days)

- Explain an aspect of the moon’s natural history.
- Learn a convention for recording the appearance of the moon.

- » Make and record regular observations of the moon.
- » Formulate questions for further research.
- » Demonstrate safe practices during investigations.

#### Unit B.5 – The Surface of the Moon (8 days)

- Examine variables that determine the appearance of craters on the moon and on Earth.
- Reconstruct the history of impact events that resulted in the present appearance of the surface of the moon.
- Explain the differences in appearance between the surface of the moon and of Earth.

- » Use simulations to recreate impact events.
- » Examine variables that affect crater characteristics.
- » Design and conduct controlled experiments to determine the effect of meteoroid size.
- » Organize data, draw conclusions, and weigh evidence about the surface features of the moon.
- » Demonstrate safe practices during investigations.

## UNIT B

### Content students have to learn

### Processes students will learn and use

#### Unit B.6 – Moon Physical Features (3 days)

- Use mathematical reasoning to describe how to determine the size of lunar features.

- » Use scaling techniques to calculate the diameters of moon craters and maria.
- » Draw accurately scaled representations of lunar craters.
- » Calculate actual dimensions from photographs.

#### Unit B.7 – Properties of Moon Materials (7 days)

- Explain how the density of a rock can be used to identify which layer of the moon it is located in.
- Identify and measure the physical properties of a mineral.

- » Establish and apply criteria for lunar rock sampling.
- » Observe, measure, and organize the properties of lunar rocks.
- » Collect a small sample of rocks and minerals.
- » Use a key to identify and analyze rock samples.
- » Demonstrate safe practices during investigations.

#### Unit B.8 – Phases of the Moon (5 days)

- Explain how the rotation and revolution of the earth and moon affect the moon's phases and when and where they are observed.
- Predict relative positions of the sun, earth, and moon when shown a representation of a moon phase.
- Describe how the moon revolves around Earth once a month, resulting in the moon rising about 50 minutes later each day.

- » Use models of the sun, moon, and Earth.
- » Sequence representations of the phases of the moon.

#### Unit B.9 – Solar System (9 days)

- Examine the features of objects in the solar system.
- Review current knowledge about the planets and propose a planetary tour to apply the knowledge.

- » Simulate a photographic technique.
- » Simulate producing a digital image of a distant object.

#### Unit B.10 – Levels of Organization of Organisms (5 days)

- Describe the cell as the basic structural unit for living organisms.
- Describe the levels of organization of organisms from cells to the whole organism.
- Illustrate the levels of organization of organisms from cells to the whole organism.

- » Apply appropriate safety measures in the classroom and laboratory.
- » Collect data and record results and observations to arrive at valid scientific conclusions.

## UNIT B

### Content students have to learn

### Processes students will learn and use

#### Unit B.11 – Classification

(9 days)

- Explain why taxonomy is an important tool for scientists.
- Describe how to use a taxonomic key to identify an organism.

- » Determine by laboratory investigations how and why organisms are classified into various groups.
- » Use a taxonomic key to apply knowledge of the classification system to identify organisms.
- » Apply appropriate safety measures in the classroom and laboratory.
- » Collect data and record results and observations to arrive at valid scientific conclusions.

#### Unit B.12 – Reproduction

(5 days)

- Compare and contrast the life cycles of plants and animals.
- Describe the function of reproduction in the continuation of a species.
- Explain the relationship between reproduction and the process of producing offspring.

- » Research and compare the stages of life, including reproduction and development, found among plants, animals, and humans.
- » Collect data and record observations to arrive at valid scientific conclusions.
- » Apply appropriate safety measures in the classroom and laboratory.

#### Unit B.13 – Heredity in Humans

(3 days)

- Describe the role of genes in inheritance.
- Explain how inherited traits are different from acquired traits.
- Observe, record, and compare inherited traits.

- » Demonstrate an understanding of inheritance by manipulating variables during an experiment.
- » Collect data and record observations to arrive at valid scientific conclusions.
- » Apply appropriate safety measures in the classroom and laboratory.

#### Unit B.14 – Genetic Changes

(5 days)

- Describe the evidence found in the fossil record that provides an understanding of the history of life on Earth.
- Describe factors that have contributed to the extinction of species.
- Explain the relationship between an organism's traits and its ability to survive and reproduce.

- » Use technology to research, record, and interpret scientific facts and theories about past life forms.
- » Read and critically examine the scientific evidence that supports how gene mutations can result in survival or extinction.
- » Collect data and record results to arrive at valid scientific conclusions.

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